

Individual Contribution

My contribution to our senior design project was managing the data pipeline to train our AI model. I was the one who handled the organization, formatting, and labeling of all image data, ensuring consistency across the dataset for optimal training performance. This involved converting all images to a uniform and labeling them accurately based on the gym equipment classes we were training the model to detect. Additionally, I was the lead developer on the Video_dectect.py script which integrates our trained Yolov5 model with either a live or prerecorded video feed. This script identifies gym equipment usage in real time and updates the SQL database accordingly. For the SQL database, both Josh and I worked together to build and maintain this database between our website and the video_dectect.py file.

Throughout this whole process, I built upon the skills I had developed in earlier coursework and greatly expanded my capabilities in machine learning, data handling, and Python scripting. One major challenge I was faced with was learning how to design and train an AI model from scratch. Particularly optimizing performance to avoid lag and dropped frames during detection. Overcoming this required a deep dive into video processing and performance tuning. These efforts helped me to develop new technical competencies and gave me a better understanding of how to connect AI with a real-time system that updates a database.

Group Contribution

As a group, we were able to successfully develop a working prototype of G.E.M.S (Gym Equipment Monitoring System) that integrates machine learning, video detections, SQL database updates, and a front-end website interface. From start to finish as a team, we were able to bring our concept into reality by training a model to recognize specific gym equipment, Detecting usage through video input, updating the equipment status in a database, and then reflecting those updates on the website in real-time. This required strong coordination between frontend and backend and machine learning components.

In this project, our teamwork was effective and collaborative. We divided responsibilities based on individual strengths but maintained frequent communication to ensure all parts worked together. Everyone contributed in meaningful ways. And our workflow allowed us to debug, test, and refine features together. We supported each other in areas where our teammates struggled. Which kept the project moving forward at a good pace.